



PATENT
Attorney Docket No.: DIVER1100-4

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Robertson *et al.*
Serial No.: 09/884,889
Filed: June 19, 2001
Title: CATALASES

Art Unit: 1643
Examiner: Unassigned

Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

In advance of the first examination in this case, Applicants request amendment of the subject application, as follows:

CERTIFICATION UNDER 37 CFR §1.8

I hereby certify that the documents referred to as enclosed herein are being deposited with the United States Postal Service as first class mail on October 10, 2001, in an envelope addressed to: Box Missing Parts, Commissioner for Patents, Washington, D.C. 20231

Karen LePar

Karen LePar

In re Application of
Robertson *et al.*
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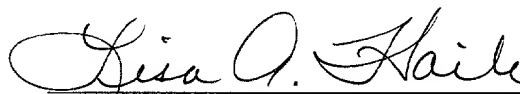
Please enter replacement Figures 5 and 6 attached hereto. As filed, the pages following page 1 of each Figure were inadvertently omitted. It is respectfully submitted that these Figures were previously submitted to the Patent and Trademark Office in the parent applications, which have been incorporated by reference into the present application. A copy of the transmittal of the present application, incorporating the parent applications is also enclosed.

The Figures are referred to in the BRIEF DESCRIPTION OF THE DRAWINGS SECTION and are fully supported by the specification, as filed. As such, entry of the replacement Figures is respectfully requested.

No fee is deemed necessary in connection with the filing of this response. However, if any fee is deemed necessary, the Commissioner is authorized to charge (or apply any credits to) Deposit Account No.: 50-1355. The Examiner is invited to contact Applicant's undersigned representative if there are any questions related to this matter.

Respectfully submitted,

Date: October 10, 2001



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FIG. 5 A
Alcaligenes (Deleya) aquamarinus Catalase - 64CA2

(SEQ ID NO: 5)
(SEQ ID NO: 6)

1	ATGAAT AAC GCA TCC GCT GAC GAT CTA CAC AGT AGC TTG CAG CAA AGA TGC AGA GCA TTT	60
1	Met Asn Asn Ala Ser Ala Asp Asp Leu His Ser Ser Leu Gln Arg Cys Arg Ala Phe	20
61	GTT CCC TTG GTA TCG CCA AGG CAT AGA GCA ATA AGG GAG AGA GCT ATG AGC GGT AAA TGT	120
61	Val Pro Leu Val Ser Pro Arg His Arg Ala Ile Arg Glu Arg Ala Met Ser Gly Lys Cys	40
121	CCT GTC ATG CAC GGT GGT AAC ACC TCG ACC GGT ACT TCC AAC AAA GAT TGG TGG CCG GAA	180
41	Pro Val Met His Gly Gly Asn Thr Ser Thr Gly Thr Ser Asn Lys Asp Trp Trp Pro Glu	60
181	GGG TTG AAC CTG GAT ATT TTG CAT CAG CAA GAT CGC AAA TCA GAC CCG ATG GAT CCG GAT	240
61	Gly Leu Asn Leu Asp Ile Leu His Gln Asp Arg Lys Ser Asp Pro Met Asp Pro Asp	80
241	TTC AAC TAC CGT GAA GAA GTA CGC AAG CTC GAT TTC GAC GCG CTG AAG AAA GAT GTC CAC	300
81	Phe Asn Tyr Arg Glu Glu Val Arg Lys Leu Asp Phe Asp Ala Leu Lys Lys Asp Val His	100
301	GCG TTG ATG ACC GAT AGC CAA GAG TGG TGG CCC GCT GAC TGG GGG CAC TAC GGC GGT	360
101	Ala Leu Met Thr Asp Ser Gln Glu Trp Trp Pro Ala Asp Trp Gly His Tyr Gly Leu	120
361	ATG ATC CGT ATG GCT TGG CAC TCC GCT GGC ACC TAC CGT ATT GCT GAT GGC CGT	420
121	Met Ile Arg Met Ala Trp His Ser Ala Gly Thr Tyr Arg Ile Ala Asp Gly Arg Gly	140
421	GGT GGT ACC GGA AGC CAG CGC TTT GCA CCG CTC AAC TCC TGG CCG GAC AAC GTC	480
141	Gly Gly Thr Gly Ser Gln Arg Phe Ala Pro Leu Asn Ser Trp Pro Asp Asn Val Ser	160
481	GAT AAA GCG CGC CGT CTG CTG TGG CCG ATC AAG AAG TAC GGC AAC AAA ATC AGC	540
161	Asp Lys Ala Arg Arg Leu Leu Trp Pro Ile Lys Lys Lys Tyr Gly Asn Lys Ile Ser	180
541	GCA GAC CTG ATG ATT CTG GCT GGC ACC GTG GCT TAT GAG TCC ATG GGC TTA CCT	600
181	Ala Asp Leu Met Ile Leu Ala Gly Thr Val Ala Tyr Glu Ser Met Gly Leu Pro Ala	200
601	GGC TTC TCT TTC GGC CGC GTC GAT ATT TGG GAA CCC GAA AAA GAT ATC TAC	660
201	Gly Phe Ser Phe Gly Arg Val Asp Ile Trp Glu Pro Glu Lys Asp Ile Tyr Trp Gly	220

FIG 5B

661 GAA AAA GAG TGG CTG GCA CCT TCT GAC GAA CGC TAC GGC GAC GTG AAC AAG CCA GAG ACC 720
 221 Glu Lys Glu Trp Leu Ala Pro Ser Asp Glu Arg Tyr Gly Asp Val Asn Lys Pro Glu Thr 240
 721 ATG GAA AAC CCG CTG GCG GCT GTC CAA ATG GGT CTG ATC TAT GTG AAC CCG GAA GGT GTT 780
 241 Met Glu Asn Pro Leu Ala Ala Val Gln Met Gly Leu Ile Tyr Val Asn Pro Glu Gly Val 260
 781 AAC GGC CAC CCT GAT CCG CTG AGA ACC GCA CAG GTA CTT GAA ACC TTC GCC CGT ATG 840
 261 Asn Gly His Pro Asp Pro Leu Arg Thr Ala Gln Val Leu Glu Thr Phe Ala Arg Met 280
 841 GCG ATG AAC GAC GAA AAA ACC GCA GCC CTC ACA GCT GGC GGC CAC ACC GTC GGT AAT TGT 900
 281 Ala Met Asn Asp Glu Lys Thr Ala Ala Leu Thr Ala Gly Gly His Thr Val Gly Asn Cys 300
 901 CAC GGT AAT GGC AAT GCC TCT TCG TTA GCC CCT GAC CCA AAA GCC TCT GAC GTT GAA AAC 960
 301 His Gly Asn Gly Asn Ala Ser Ala Leu Ala Pro Asp Pro Lys Ala Ser Asp Val Glu Asn 320
 961 CAG GGC TTA GGT TGG GGC AAC CCC AAC ATG CAG GGC AAG GCA AGC AAC GCC GTG ACC TCG 1020
 321 Gln Gly Leu Gly Trp Gly Asn Pro Asn Met Gln Gly Lys Ala Ser Asn Ala Val Thr Ser 340
 1021 GGT ATC GAA GGT GCT TGG ACC ACC AAC CCC ACG AAA TTC GAT ATG GGC TAT TTC GAC CTG 1080
 341 Gly Ile Glu Gly Ala Trp Thr Thr Asn Pro Thr Lys Phe Asp Met Gly Tyr Phe Asp Leu 360
 1081 CTG TTC GGC TAC AAT TGG GAA CTG AAA AAG AGT CCT GCC GGT GCC CAC CAT TGG GAA CCG 1140
 361 Leu Phe Gly Tyr Asn Trp Glu Leu Lys Lys Ser Pro Ala Gly Ala His His Trp Glu Pro 380
 1141 ATT GAC ATC AAA AAG GAA AAC AAG CCG GTT GAC GCC AGC GAC CCC TCT ATT CGC CAC AAC 1200
 381 Ile Asp Ile Lys Lys Glu Asn Lys Pro Val Asp Ala Ser Asp Pro Ser Ile Arg His Asn 400
 1201 CCG ATC ATG ACC GAT GCG GAT ATG GCG ATA AAG GTA AAT CCG ACC TAT CGC GCT ATC TGC 1260
 401 Pro Ile Met Thr Asp Ala Asp Met Ala Ile Lys Val Asn Pro Thr Tyr Arg Ala Ile Cys 420
 1261 GAA AAA TTC ATG GCC GAT CCT GAG TAC TTC AAG AAA ACT TTC GCG AAG GCG TGG TTC AAG 1320
 421 Glu Lys Phe Met Ala Asp Pro Glu Tyr Phe Lys Lys Thr Phe Ala Lys Ala Trp Phe Lys 440
 1321 CTG ACG CAC CGT GAC CTG GGC CCG AAA TCA CGT TAC ATC GGC CCG GAA GTG CCG GCA GAA 1380
 441 Leu Thr His Arg Asp Leu Gly Pro Lys Ser Arg Tyr Ile Gly Pro Glu Val Pro Ala Glu 460

FIG. 5C

1381 GAC CTG ATT TGG CAA GAC CCG ATT CCG GCA GGT AAC ACC GAC TAC TGC GAA GAA GTG GTC 1440
461 Asp Leu Ile Trp Gln Asp Pro Ile Pro Ala Gly Asn Thr Asp Tyr Cys Glu Glu Val Val 480

1441 AAG CAG AAA ATT GCA CAA AGT GGC CTG AGC ATT AGT GAG ATG GTC TCC ACC GCT TGG GAC 1500
481 Lys Gln Lys Ile Ala Gln Ser Gly Leu Ser Ile Ser Glu Met Val Ser Thr Ala Trp Asp 500

1501 AGT GCC CGT ACT TAT CGC GGT TCC GAT ATG CGC GGC GGT AAC GGT GCC CGC ATT CGC 1560
501 Ser Ala Arg Thr Tyr Arg Gly Ser Asp Met Arg Gly Ala Asn Gly Ala Arg Ile Arg 520

1561 TTG GCC CCA CAG AAC GAG TGG CAG GGC AAC GAG CCG GAG CGC CTG GCG AAA GTG CTG AGC 1620
521 Leu Ala Pro Gln Asn Glu Trp Gln Gly Asn Glu Pro Glu Arg Leu Ala Lys Val Leu Ser 540

1621 GTC TAC GAG CAG ATC TCT GCC GAC ACC GGC GCT AGC ATC GCG GAC GTG ATC GTT CTG GCC 1680
541 Val Tyr Glu Gln Ile Ser Ala Asp Thr Gly Ala Ser Ile Ala Asp Val Ile Val Leu Ala 560

1681 GGT AGC GTA GGC ATC GAG AAA GCC GCG AAA GCA GCA GGT TAC GAT GTG CGC GTT CCC TTC 1740
561 Gly Ser Val Gly Ile Glu Lys Ala Ala Lys Ala Ala Gly Tyr Asp Val Arg Val Pro Phe 580

1741 CTG AAA GCC CGT GGC GAT GCG ACC GCC CAG ATG ACC GAC GCA GAC TCC TTC GCA CCG CTG 1800
581 Leu Lys Gly Arg Gly Asp Ala Thr Ala Glu Met Thr Asp Ala Asp Ser Phe Ala Pro Leu 600

1801 GAG CCG CTG GCC GAT GGC TTC CGC AAC TGG CAG AAG AAA GAG TAT GTG GTG AAG CCG GAA 1860
601 Glu Pro Leu Ala Asp Gly Phe Arg Asn Trp Gln Lys Lys Glu Tyr Val Val Lys Pro Glu 620

1861 GAG ATG CTG CTG GAT CGT GCG CAG CTG ATG GGC TTA ACC GGC CCG GAA ATG ACC GTG CTG 1920
621 Glu Met Leu Leu Asp Arg Ala Gln Leu Met Gly Leu Thr Gly Pro Glu Met Thr Val Leu 640

1921 CTG GGC GGT ATG CGC GTA CTG GGC ACC AAC TAT GGT GGC ACC AAA CAC GGC GTA TTC ACC 1980
641 Leu Gly Gly Met Arg Val Leu Gly Thr Asn Tyr Gly Gly Thr Lys Lys His Gly Val Phe Thr 660

1981 GAT TGT GAA GGC CAG TTG ACC AAC GAC TTT TTT GTG AAC CTG ACC GAT ATG GGG AAC AGC 2040
661 Asp Cys Glu Gly Gln Leu Thr Asn Asp Phe Phe Val Asn Leu Thr Asp Met Gly Asn Ser 680

2041 TGG AAG CCG GTA GGT AGC AAC GCC TAC GAA ATC CGC GAC CGC AAG ACC GGT GCC GTG AAG 2100
681 Trp Lys Pro Val Gly Ser Asn Ala Tyr Glu Ile Arg Asp Arg Lys Thr Gly Ala Val Lys 700

FIG. 5D

2101 TGG ACC GCC TCG CCG GTG GAT CTG GTA TTT GGT TCC AAC TCG CTA CTG CGC TCT TAC GCA 2160
 701 Trp Thr Ala Ser Arg Val Asp Leu Val Phe Gly Ser Asn Ser Leu Leu Arg Ser Tyr Ala 720
 2161 GAA GTG TAC GCC CAG GAC GAT AAC GGC GAG AAG TTC GTC AGA GAC TTC GTC GCC GCC TGG 2220
 721 Glu Val Tyr Ala Gln Asp Asp Asn Gly Glu Lys Phe Val Arg Asp Phe Val Ala Ala Trp 740
 2221 ACC AAA GTG ATG AAC GCC GAC CGT TTC GAC GTC GCG TCG TAA 2262
 741 Thr Lys Val Met Asn Ala Asp Arg Phe Asp Val Ala Ser End 754

FIG. 6A
Microscilla furvescens Catalase - 53CA1

(SEQ ID NO: 7)
(SEQ ID NO: 8)

1	ATG GAA AAT CAC AAA CAC TCA GGA TCT TCT ACG TAT AAC ACA AAC ACT GGC GGA AAA TGC	60
1	Met Glu Asn His Lys His Ser Gly Ser Thr Tyr Asn Thr Asn Thr Gly Gly Lys Cys	20
61	CCT TTT ACC GGA GGT TCG CTT AAG CAA AGT GCA GGT GGC GGC ACC AAA AAC AGG GAT TGG	120
21	Pro Phe Thr Gly Gly Ser Leu Lys Gln Ser Ala Gly Gly Thr Lys Asn Arg Asp Trp	40
121	TGG CCC AAC ATG CTC AAC CTC GGC ATC TTA CGC CAA CAT TCA TCG CTA TCG GAC CCA AAC	180
41	Trp Pro Asn Met Leu Asn Leu Gly Ile Leu Arg Gln His Ser Ser Leu Ser Asp Pro Asn	60
181	GAC CCG GAT TTT GAC TAT GCC GAA GAG TTT AAG AAG CTA GAT CTG GCA GCG GTT AAA AAG	240
61	Asp Pro Asp Phe Asp Tyr Ala Glu Glu Phe Lys Lys Leu Asp Leu Ala Val Lys Lys	80
241	GAC CTG GCA GCG CTA ATG ACA GAT TCA CAG GAC TGG TGG CCA GCA GAT TAC GGT CAT TAT	300
81	Asp Leu Ala Ala Leu Met Thr Asp Ser Gln Asp Trp Trp Pro Ala Asp Tyr Gly His Tyr	100
301	GGC CCC TTC TTT ATA CGC ATG GCG TGG CAC AGC GCC GGC ACC TAC CGT ATC GGT GAT GGC	360
101	Gly Pro Phe Phe Ile Arg Met Ala Trp His Ser Ala Gly Thr Tyr Arg Ile Gly Asp Gly	120
361	CGT GGT GGC GGT GGC TCC GGC TCA CAG CGC TTC GCG CCT CTC AAT AGC TGG CCA GAC AAT	420
121	Arg Gly Gly Gly Ser Gly Ser Gln Arg Phe Ala Pro Leu Asn Ser Trp Pro Asp Asn	140
421	GCC AAT CTG GAT AAA GCA CGC TTG CTT CTT TGG CCC ATC AAA CAA AAA TAC GGT CGA AAA	480
141	Ala Asn Leu Asp Lys Ala Arg Leu Leu Trp Pro Ile Lys Gln Lys Tyr Gly Arg Lys	160
481	ATC TCC TGG GCG GAT CTA ATG ATA CTC ACA GGA AAC GTA GCT CTG GAA ACT ATG GGC TTT	540
161	Ile Ser Trp Ala Asp Leu Met Ile Leu Thr Gly Asn Val Ala Leu Glu Thr Met Gly Phe	180
541	AAA ACT TTT GGT TTT GCA GGT GGC AGA GCA GAT GTA TGG GAG CCT GAA GAA GAT GTA TAC	600
181	Lys Thr Phe Gly Phe Ala Gly Gly Arg Ala Asp Val Trp Glu Pro Glu Glu Asp Val Tyr	200
601	TGG GGA GCA GAA ACC GAA TGG CTG GGA GAC AAG CGC TAT GAA GGT GAC CGA GAG CTC GAA	660
201	Trp Gly Ala Glu Thr Glu Trp Leu Gly Asp Lys Arg Tyr Glu Gly Asp Arg Glu Leu Glu	220

FIG. 6B

661 AAT CCC CTG GGA GCC GTA CAA ATG GGA CTC ATC TAT GTA AAC CCC GAA GGA CCC AAC GGC 720
 221 Asn Pro Leu Gly Ala Val Gln Met Gly Leu Ile Tyr Val Asn Pro Glu Gly Pro Asn Gly 240
 721 AAG CCA GAC CCT ATC GCT GCT GCG CGT GAT ATT CGT GAG ACT TTT GGC CGA ATG GCA ATG 780
 241 Lys Pro Asp Pro Ile Ala Ala Ala Arg Asp Ile Arg Glu Thr Phe Gly Arg Met Ala Met 260
 781 AAT GAC GAA GAA ACC GTG GCT CTC ATA GCG GGT GGA CAC ACC TTC GGA AAA ACC CAT GTT 840
 261 Asn Asp Glu Glu Thr Val Ala Leu Ile Ala Gly Gly His Thr Phe Gly Lys Thr His Gly 280
 841 GCT GCC GAT GCG GAG AAA TAT GTG GGC CGA GAG CCT GCC GCC GCA GGT ATT GAA GAA ATG 900
 281 Ala Ala Asp Als Glu Lys Tyr Val Gly Arg Glu Pro Ala Ala Ala Gly Ile Glu Glu Met 300
 901 AGC CTG GGG TGG AAA AAC ACC TAC GGC ACC GGA CAC GGT GCG GAT ACC ATC ACC AGT GGA 960
 301 Ser Leu Gly Trp Lys Asn Thr Tyr Gly Thr Gly His Gly Ala Asp Thr Ile Thr Ser Gly 320
 961 CTA GAA GGC GCC TGG ACC AAG ACC CCT ACT CAA TGG AGC AAT AAC TTT TTT GAA AAC CTC 1020
 321 Leu Glu Gly Ala Trp Thr Lys Thr Pro Thr Gln Trp Ser Asn Asn Phe Phe Glu Asn Leu 340
 1021 TTT GGT TAC GAG TGG GAG CTT ACC AAA AGT CCA GCT GGA GCT TAT CAG TGG AAA CCA AAA 1080
 341 Phe Gly Tyr Glu Trp Glu Leu Thr Lys Ser Pro Ala Gly Ala Tyr Gln Trp Lys Pro Lys 360
 1081 GAC GGT GCC GGG GCT GGC ACC ATA CCG GAT GCA CAT GAT CCC AGC AAG TCG CAC GCT CCA 1140
 361 Asp Gly Ala Gly Ala Gly Thr Ile Pro Asp Ala His Asp Pro Ser Lys Ser His Ala Pro 380
 1141 TTT ATG CTC ACT ACG GAC CTG GCG CTG CGC ATG GAC CCT GAT TAC GAA AAA ATT TCT CGA 1200
 381 Phe Met Leu Thr Thr Asp Leu Ala Leu Arg Met Asp Pro Asp Tyr Glu Lys Ile Ser Arg 400
 1201 CGG TAC TAT GAA AAC CCT GAT GAG TTT GCA GAT GCT TTC GCG AAA GCA TGG TAC AAA CTG 1260
 401 Arg Tyr Tyr Glu Asn Pro Asp Glu Phe Ala Asp Ala Phe Ala Lys Ala Trp Tyr Lys Leu 420
 1261 ACA CAC AGA GAT ATG GGA CCA AAG GTG CGC TAC CTG GGA CCA GAA GTG CCT CAG GAA GAC 1320
 421 Thr His Arg Asp Met Gly Pro Lys Val Arg Tyr Leu Gly Pro Glu Val Pro Gln Glu Asp 440
 1321 CTC ATC TGG CAA GAC CCT ATA CCA GAT GTA AGC CAT CCT CTT GTA GAC GAA AAC GAT ATT 1380
 441 Leu Ile Trp Gln Asp Pro Ile Pro Asp Val Ser His Pro Leu Val Asp Glu Asn Asp Ile 460

FIG. 6C

1381 GAA GGC CTA AAA GCC AAA ATC CTG GAA TCG GGA CTG ACG GTA AGC GAG CTG GTA AGC ACG 1440
461 Glu Gly Leu Lys Ala Lys Ile Leu Glu Ser Gly Leu Thr Val Ser Glu Leu Val Ser Thr 480

1441 GCA TGG GCT TCT GCA TCT ACT TTT AGA AAC TCT GAC AAG CGC GGC GGT GCC AAC GGT GCA 1500
481 Ala Trp Ala Ser Ala Ser Thr Phe Arg Asn Ser Asp Lys Arg Gly Gly Ala Asn Gly Ala 500

1501 CGT ATA CGA CTG GCC CCA CAA AAA GAC TGG GAA GTA AAC AAC CCT CAG CAA CTT GCC AGG 1560
501 Arg Ile Arg Leu Ala Pro Gln Lys Asp Trp Glu Val Asn Asn Pro Gln Gln Leu Ala Arg 520

1561 GTA CTC AAA ACA CTA GAA GGT ATC CAG GAG GAC TTT AAC CAG GCG CAA TCA GAT AAC AAA 1620
521 Val Leu Lys Thr Leu Glu Gly Ile Gln Glu Asp Phe Asn Gln Ala Gln Ser Asp Asn Lys 540

1621 GCA GTA TCG TTG GCC GAC CTG ATT GTG CTG GCC GGC TGT GCG GGT GTA GAA AAA GCT GCA 1680
541 Ala Val Ser Leu Ala Asp Leu Ile Val Leu Ala Gly Cys Ala Gly Val Glu Lys Ala Ala 560

1681 AAA GAT GCT GGC CAT GAG GTG CAG GTG CCT TTC AAC CCG GGA CGA GCG GAT GCC ACC GCT 1740
561 Lys Asp Ala Gly His Glu Val Gln Val Pro Phe Asn Pro Gly Arg Ala Asp Ala Thr Ala 580

1741 GAG CAA ACC GAT GTG GAA GCT TTC GAA GCA CTA GAG CCA CCG GCT GAC GGC TTT AGA AAC 1800
581 Glu Gln Thr Asp Val Glu Ala Phe Glu Ala Leu Glu Pro Ala Ala Asp Gly Phe Arg Asn 600

1801 TAC ATT AAA CCG GAG CAT AAA GTA TCC GCT GAG GAA ATG CTC GTA GAC CCG GCG CAG CTT 1860
601 Tyr Ile Lys Pro Glu His Lys Val Ser Ala Glu Glu Met Leu Val Asp Arg Ala Gln Leu 620

1861 CTG TCG CTT TCG GCA CCA GAA ATG ACT GCT TTG GTA GGC GGT ATG CGT GTA CTG GGC ACC 1920
621 Leu Ser Leu Ser Ala Pro Glu Met Thr Ala Leu Val Gly Gly Met Arg Val Leu Gly Thr 640

1921 AAC TAC GAC GGT TCG CAG CAT CGA GTG TTT ACA AAT AAG CCG GGT CAG CTA TCC AAT GAC 1980
641 Asn Tyr Asp Gly Ser Gln His Gly Val Phe Thr Asn Lys Pro Gly Gln Leu Ser Asn Asp 660

1981 TTC TTT GTA AAC CTG CTA GAC CTC AAC ACT AAA TGG CGA GCC AGC GAT GAA TCA GAC AAA 2040
661 Phe Phe Val Asn Leu Leu Asp Leu Asn Thr Lys Trp Arg Ala Ser Asp Glu Ser Asp Lys 680

2041 GTT TTT GAA GGC AGA GAC TTC AAA ACT GGC GAA GTA AAG TGG AGT GGC ACC CCG GTA GAC 2100
681 Val Phe Glu Gly Arg Asp Phe Lys Thr Gly Glu Val Lys Trp Ser Gly Thr Arg Val Asp 700

FIG. 6D

2101 CTG ATC TTC GGA TCC AAT TCC GAG CTA AGA GCC CTC GCA GAA GTG TAC GGC TGT GCA GAT 2160
 701 Leu Ile Phe Gly Ser Asn Ser Glu Leu Arg Ala Leu Ala Glu Val Tyr Gly Cys Ala Asp 720
 2161 TCT GAA GAA AAG TTT GTT AAA GAT TTT GTG AAG GCC TGG GCC AAA GTA ATG GAC CTG GAC 2220
 721 Ser Glu Glu Lys Phe Val Lys Asp Phe Val Lys Ala Trp Ala Lys Val Met Asp Leu Asp 740
 2221 CGG TTT GAT CTG AAA TAA 2238
 741 Arg Phe Asp Leu Lys End 746